

APPENDIX B

APPENDIX B1
Cumulative Impacts Analysis

Plymouth Generating Facility Cumulative Impact Analysis

A cumulative impact analysis was conducted to determine the air quality impact of the Plymouth Generating Facility when combined with the air quality impacts of other energy projects in the region. The cumulative impact analysis was performed using methods and assumptions similar to those used in the local-scale impact analysis described in the main body of this Environmental Impact Statement (EIS). The reader is referred to the air quality sections of the EIS for further discussion on these methods and assumptions.

The major steps in the cumulative analysis were:

- Determination of the sources to consider,
- Definition of a modeling domain,
- Selection of an air quality model,
- Preparation of input information for the model,
- Exercising the model to determine the air quality impacts of the combined sources, and
- Evaluation of the model results.

Included in the analysis were all energy sources in the Umatilla/Hermiston area. It included those that are already constructed and operating as well as those in various states of permitting or construction. The sources included along with all pertinent model information are listed in Table 1. Figure 1 shows the location of these sources with respect to the Plymouth Generating Facility.

The largest distance between any two facilities included in the regional modeling is approximately 35 kilometers. The selected modeling domain, shown in Figure 1, is roughly 60 kilometers on a side. This domain was selected to cover the area of the 9 facilities in Table 1, and to include some buffer area and critical terrain in the vicinity. In the air quality modeling for the Plymouth facility by itself (discussed in the body of this EIS) the peak air quality impacts were within 7 kilometers of the plant. It is expected that overlapping impacts from the 8 facilities will fall well within the modeling domain.

Given that plume travel distances to critical terrain and other receptors within the modeling domain are less than 50 kilometers, the air quality model selected was the ISCST3-prime (EPA; Version 99020) model. The basis for selection was the same as for the local scale modeling discussed in the EIS, and follows EPA guidance on model selection.

The same meteorological data were used in the cumulative modeling analysis as in the local scale modeling discussed in the air quality sections of the EIS. The meteorological data were collected at the Pendleton airport. A full five-year data set from Pendleton, for the years 1987 through 1991, was used in the current analysis. The air quality sections of the EIS have more detail on the meteorological data and the basis for their selection.

The purpose of the cumulative modeling was to determine the impact of the Plymouth Generating Facility when combined with the impacts of the other facilities. Accordingly the receptor locations selected for the current modeling focused on those areas where the Plymouth Generating Facility was expected to have some impact. These are primarily locations close to the Plymouth Generating facility, since the local scale modeling had determined the impact of the Plymouth facility was greatest within 7 kilometers of the source. The receptors used in the current analysis included all the receptors used in the local scale modeling, plus an additional array of receptors to cover the remainder of the modeling domain. This additional receptor grid included an array of receptors, with a grid spacing of 2500 meters. Figure 2 depicts the receptors used in the cumulative modeling.

The ISCST3-prime model was run separately for each of four major criteria pollutants: oxides of nitrogen (NO_x), sulfur dioxide (SO₂), carbon monoxide (CO) and inhalable particulate matter (PM₁₀). The results of the modeling are summarized in Table 2, where the model-predicted cumulative air quality impacts are compared with Washington and National Ambient Air Quality Standards.

Table 2 indicates emissions from existing and proposed major emission sources in the vicinity of the PGF (including some sources that are a considerable distance away) result in ambient concentrations that are very low in comparison with ambient air quality standards established to protect human health and welfare. Although background concentrations need to be considered in an absolute determination of compliance, this assessment considered the key sources of air pollution emissions in the project area. It is clear from the following percentages that there is ample margin for background sources of emissions, especially when the rural nature of the project area is considered:

- The maximum cumulative NO₂ concentration is only 1.3 percent of the annual standard.
- The maximum cumulative SO₂ concentrations are 26 percent of the 1-hour standard, 7 percent of the 3-hour and 24-hour standards, and 2.6 percent of the annual standard.
- The maximum cumulative CO concentrations are 0.3 percent of the 1-hour standard and 0.6 percent of the 8-hour standard.
- The maximum PM₁₀ concentrations are 4.7 percent of the 24-hours standard and 2.8 percent of the annual standard.

MFG concludes that the cumulative air pollutant emissions from the Plymouth Generating facility and other significant energy facilities in the region do not cause a significant adverse air quality impact in the project area.

Table 1
Cumulative Impact Analysis
Plymouth Generating Facility
List of Included Sources in the Cumulative Air Quality Modeling

Facility Name	X-UTM Coordinate (meters)	Y-UTM Coordinate (meters)	Elevation (feet)	Stack Ht. (feet)	Stack Diameter (feet)	Exhaust Temp. (Deg. F)	Exhaust Velocity (ft/sec)	NOx Emission Rate (lb/hr)	CO Emission Rate (lb/hr)	SO ₂ Emission Rate (lb/hr)	PM ₁₀ Emission Rate (lb/hr)
Plymouth Generating Facility	313588	5089250	312	150	19.00	187	43.3	18.4	11.2	17.25	24
Coyote Springs I	292435	5080489	278	210	16.50	190	78.3	30	51	1	5
Coyote Springs II	291805.1	5080462	274	210	18.01	190	64.4	30	51	1	5
Morrow Gen. Project	296013	5079854	347	213	20.01	185	56.0	40	98	10	48
Umatilla Gen. Project	315155	5074967	568	213	20.01	185	56.0	40	98	10	48
Hermiston Pwr Project	320300	5073520	615	195	19.00	200	39.5	72	260	3	38
Wanapa Energy Center	326683.6	5087848	518	200	19.00	179	65.6	122	550	6	110
Hermiston Generating Project	315890	5074940	560	213	18.01	206	64.6	62	102	1	15
Boardman Coal Plant	282200	5063800	686	656	22.64	334	99.4	4055	175	6952	241

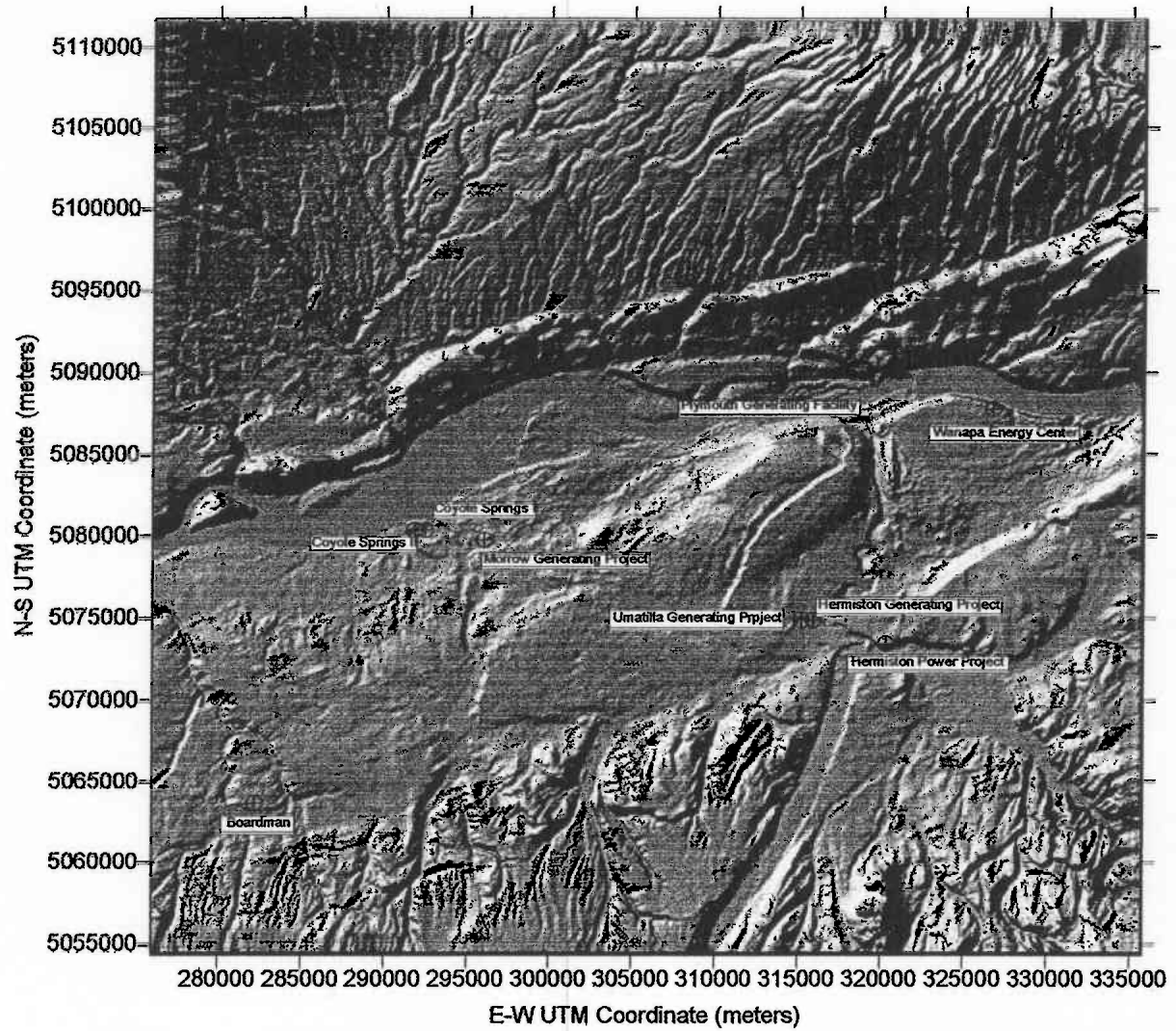


Figure 1. Location of Emission Sources Included in the Regional Modeling

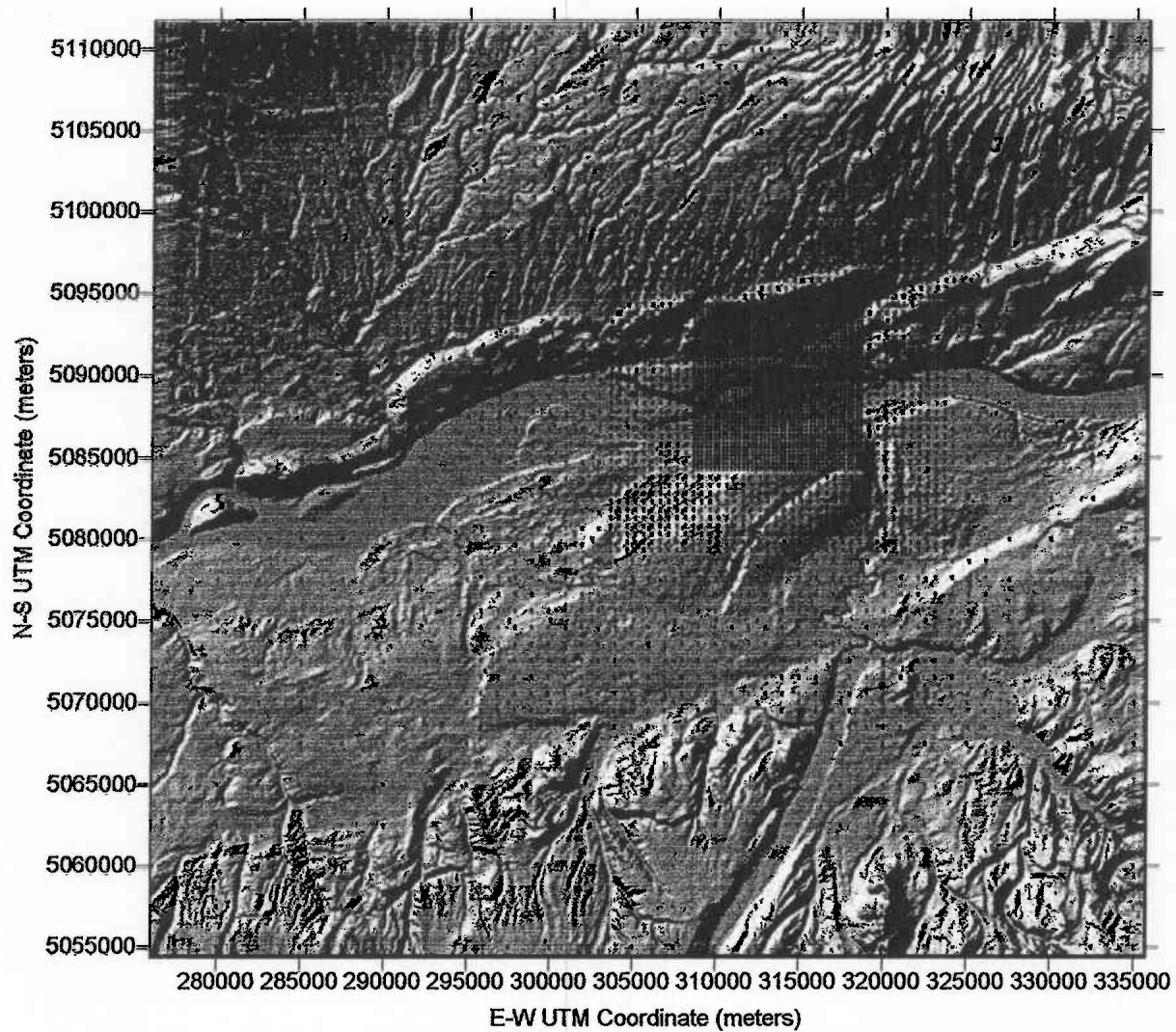


Figure 2. Location of Receptors Used in the Regional Modeling

Table 2
Cumulative Impact Analysis
Plymouth Generating Facility
Summary of Model Results

Pollutant	Averaging Time	Peak Combined Concentration (ug/m3)	Washington Ambient Air Quality Standard (ug/m3)	National Ambient Air Quality Standard (ug/m3)
NO2 (a)	Annual	1.3	100	100
SO2	1-hour	259	1000	(b)
	3-hour	86	(b)	1300
	24-hour	17	260	365
	Annual	1.3	80	50
CO	1-hour	103	40000	40000
	8-hour	64	10000	10000
PM10	24-hour	7	150	150
	Annual	1.4	50	50

- (a) NOx is conservatively assumed to be fully converted to NO2
(b) Has not been established